

# CASE STUDY

## The Chiropractic Care of an Adolescent with Tourette's Syndrome Using the Pierce Results System™

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### Abstract

**Objective:** To report the improvement in symptoms in an adolescent suffering from Tourette's Syndrome under chiropractic care.

**Clinical Features:** A 14-year old male presented with complaints of motor tics, migraine headaches and severe "fatigue." The patient was experiencing 1,000 "violent" motor tics a day and was medicated with 6 Ibuprofen pills, 10 mgs of Abilify, and 1mg of ORAP (Pimozide) per day. Physical examination augmented with thermal and infrared thermography and radiological examination demonstrated sites of spinal subluxations.

**Intervention and Outcomes:** The patient was cared for with the Pierce Results System.™ Over the course of 30 patient visits in a period of 5 months, dramatic reductions were reported in the amount of tics experienced daily. The total number tics were reduced from 1,000 a day to 30-35 tics per day. The patient's dependence on Ibuprofen was eliminated and his medication dosage (i.e., Abilify and Pimozide) was reduced by his medical provider.

**Conclusion:** A patient with Tourette's Syndrome experienced subjective and objective improvements in symptoms under chiropractic care using the Pierce Results System.™ Further research is recommended to examine the effectiveness of this type of chiropractic intervention in similar patients.

**Key words:** *Tourette's Syndrome, Pierce Results System™, pediatric migraine, vertebral subluxation, chiropractic*

### Introduction

Ten years before the discovery of chiropractic, Georges Gilles de la Tourette described the major clinical features of the disorder that now bears his name. Tourette's Syndrome is characterized by sudden, brief, repetitive involuntary or semi-voluntary movements (motor) or sounds (phonic).<sup>1</sup> Medical treatments can involve behavioral, pharmacologic, or surgical interventions, dependent on the extent to which the disorder

incapacitates its sufferer. Complete resolution is almost impossible and like other chronic and recurrent medical conditions, its sufferers (children and adults) turn to alternative therapies to complement their medical care.<sup>2</sup> Additional motivations include concerns on the use of off-label medications and their side effects and the perceived safety of alternative therapies.<sup>3-4</sup>

Pediatric off-label prescribing is the prescribing of medications outside its intended and indicated use and is very common in the medical care of children.<sup>5</sup> The lack of safety

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(i.e., well documented adverse events) and effectiveness (i.e., accurate and up-to-date information and dosage) of off-label drugs is a concern by all, particularly by parents.<sup>6</sup> In instances where medications are tested in the pediatric population, there is documented lack of efficacy with serious side effects. For example, Pringsheim and Marras<sup>7</sup> evaluated the efficacy and harms of Pimozide in comparison to placebo or other medications in the treatment of tics in Tourette Syndrome.

The investigators found the methodological quality of their studies of interest as 'fair' and with documented side effects. In another study, Sallee et al.<sup>8</sup> evaluated relative efficacy and safety of Pimozide and Haloperidol in the treatment of Gilles de la Tourette's syndrome in children and adolescents. The investigators found that Pimozide proved significantly different from placebo in affecting the course of the syndrome, whereas Haloperidol failed to have a significant effect. Furthermore, Haloperidol exhibited a threefold higher frequency of serious side effects and significantly greater extrapyramidal symptoms relative to Pimozide.

Of the various practitioner-based CAM therapies, chiropractic is the most popular and highly sought after in the care of children.<sup>9-12</sup> To explore the possible effectiveness of chiropractic care in patients with a neurological disorder and contribute to evidence-informed practice, we describe the successful care of an adolescent with medically diagnosed Tourette's Syndrome.

### Case Report

The patient was a 14-year-old male presenting to a chiropractic office with the consent of his mother for the purpose of seeking possible relief from the symptoms associated with Tourette's Syndrome. The patient had missed school the previous two days prior to presenting to the chiropractor due to the severity of his motor tics, migraine headaches and severe "fatigue" as a consequence/side effect attributed to his prescribed medications. The patient's symptoms were so severe that his mother kept a vigilant observation of her son out of concern.

The patient was indicated as having 1,000 "violent" motor tics a day that consisted of whipping his head involuntarily in flexion and extension, which also contributed to his fatigue. The patient's migraine headaches (which occurred daily) were attributed as resulting from these motor tics. The patient was taking 6 Ibuprofen pills, 10 mgs of Abilify® (aripiprazole), and 1mg of Orap® (Pimozide) per day.

A chiropractic examination was performed and included range of motion, static and motion digital palpation, thermal scans and radiographic analysis. Full-spine thermal scans utilized the Tytron™ C-5000 scanner coupled with the Platinum System's infrared thermography camera. This evaluation procedure revealed multiple thermal asymmetries present on the patient's paraspinal regions. Radiographic examination of the patient revealed biomechanical changes in the patient's cervical spine.

The AP lumbosacral film analysis revealed the sacrum as displaced/subluxated to the right. The presence of a knife clasp vertebrae at L5/S1 vertebral levels were also noted. A

lumbar body rotation to the side opposite of sacral displacement was also noted. These findings correlate to a Pierce Results System™ listing known as a false IN/EX. The IN/EX listing represents the appearance of the left ilium rotated internally and the right ilium rotated externally with the sacrum deviating to the externally rotated ilium.

A flexion/extension radiographic view of the patient's cervical spine revealed several cervical vertebral levels of intersegmental kinesiopathology known as "vertebral locking" in the Pierce technique. The C<sub>6</sub>, C<sub>7</sub>, and T<sub>1</sub> vertebral bodies were "locked in extension" indicating that these segments did not exhibit a normal motion pattern where each vertebrae are expected to approximate (or come closer together) on cervical spine extension and "fan out" on cervical spine flexion. The chiropractic thermographic and radiographic examination showed that multiple vertebral subluxations were present and located at the cervical spine and pelvis.

Based on the examination findings as described above, the patient was cared for following the protocols developed by the Pierce Results System™ for the correction of vertebral subluxation. The system was developed by the use of hand, instrument, and pressure adjustments. The patient was seen a total of thirty times over the course of five months. In order to address the sacral rotation, a P-A toggle-set was performed on the patient's right sacrum halfway between the PSIS and S<sub>2</sub> vertebral level on the side of lowest lumbar body rotation.

The toggle-set utilized a high velocity low amplitude thrust delivered to the sacrum assisted by a pelvic drop mechanism on the Zenith model 60 table. A P-A toggle set was also performed in the dorsal spine at the C<sub>6</sub>, C<sub>7</sub>, and T<sub>1</sub> vertebral levels in accordance with the radiographic findings. This was performed using the dorsal and cervical drop pieces on the Zenith Model 60 table. The doctor placed his fleshy pisiform on the most posterior inferior aspect of the spinous process being adjusted, and was reinforced by placing the opposite hand's pisiform in the anatomical snuff box of the contact hand.

At visit thirty, comparative thermal and infrared scans were performed in addition to cervical flexion/extension radiographic examination. The comparative radiographic examination showed that the C<sub>6</sub>-C<sub>7</sub> functional spinal unit extension lock was no longer present. The patient reported that he had not experienced any migraine headaches since receiving chiropractic adjustments, as well as dramatic reductions in the amount of tics he had previously experienced every day. The total number tics were reduced from 1,000 a day to 30-35 tics per day. The patient also indicated that he was no longer dependent on Ibuprofen since his first week of chiropractic care. The dosage of Abilify was reduced to 2.5mg daily, and ORAP (Pimozide) was reduced to 0.5 mg daily on medical consent.

### Discussion

Since 1885, Tourette's Syndrome has evolved from a purely psychological disorder to one with biologic, genetic and brain imaging features consistent with a neurobiological disorder. Its onset occurs during childhood and is often associated with

psychiatric co-morbidities such as obsessive-compulsive disorder (OCD) and attention deficit hyperactivity disorder (ADHD).<sup>13-14</sup>

Tourette's Syndrome has been found in all countries, ethnicities and social class with initial prevalence estimates at a rate of 5 per 10,000 school-age children (0.05%).<sup>15-16</sup> In the last two decades, prevalence estimates place the disorder at 0.3% to 0.8% among school-age population of children.<sup>15, 17-18</sup>

### *Clinical Features and Diagnosis*

The birth, developmental and medical histories are said to be unremarkable in the individual with Tourette's Syndrome. The neurological examination may also be unremarkable except for the presence of tics such as rapid eye blinking, subtle ocular movements, stuttering and mild motor-dysfunction. Therefore, the diagnosis of Tourette's Syndrome is made on the basis of the tic episodes. It is beyond the scope of this manuscript to provide the details of the diagnosis of disorder and refer the reader to the Diagnostic and Statistical Manual of Mental Disorders, 4th ed. (DSM-IV)<sup>19</sup> for details on the diagnosis.

The tics are the defining features of the disorder with onset of motor tics at approximately 7 years of age followed by phonic tics at approximately 11 years of age. We note however that tics alone occurs in approximately 18% of school-aged children and this is more likely to be encountered than tics associated with Tourette's Syndrome.

Motor tics are simple (i.e., eyelid blinking, nose twitching, shoulder or a limb movement, moving the head as if to clear hair from the front of the face, sudden head nodding, etc.) to complex (grimacing with head twisting, gyrating, kicking, or other complex repetitive movements, etc.) while phonic tic may also be simple (i.e., throat clearing, grunting, sniffing, coughing) to more linguistically meaningful phonic tics such as coprolalia (obsessive use of obscene language), echolalia (uncontrollable repetition of spoken words by someone else), copropraxia (involuntary performance of obscene gestures), palilalia (rapid repetition of words or phrases) and palipraxia (repetitive movements).

The tics are said to wax and wane from being barely noticeable to being very obvious. They occur many times per day and almost everyday with very dynamic characteristics with respect to its location, frequency, type and severity. Tourette's Syndrome peaks at around pre-adolescence and resolving in half of its sufferers by early adulthood.<sup>20</sup>

To characterize the prevalence of complementary and alternative medicine (CAM) in pediatric neurology patients, Soo and colleagues<sup>11</sup> found that CAM therapies were, similar to the adult population, common among pediatric neurology patients. The most common CAM therapies were chiropractic (15%), dietary therapy (12%), herbal remedies (8%), homeopathy (8%), and prayer/faith healing (8%). Specific to sufferers of Tourette's Syndrome, Kompoli and colleagues<sup>21</sup> examined CAM use with a survey in an academic movement disorder center.

Of 100 patients or parents, 64 responders had used at least one

CAM modality that included prayer, vitamins, massage, dietary supplements, chiropractic care, meditation, diet alterations, yoga, acupuncture, hypnosis, homeopathy, and electroencephalographic biofeedback. Over half of the patients using CAM reported some improvement. In a similar study, Mantel and colleagues<sup>22</sup> found that 87.8% of their respondents (N=115) reported using 1 or more of 29 nutritional supplements to control symptoms in addition to other types of CAM therapies. According to the authors, most of the supplement users reported an improvement in tic symptoms.

### *Chiropractic Care*

To provide further context to our discussions on the chiropractic care of individuals suffering from Tourette's Syndrome, we performed a systematic review of the literature. We consulted MANTIS [1990-2012], Index to Chiropractic Literature [1984-2012] and Pubmed [1990-2012] in these efforts using the search terms "Tourette Syndrome" OR "Tourette's Syndrome" AND "chiropractic."

Inclusion criteria for our review included the following. The study was a primary investigation report describing the clinical care of a patient that included a diagnosis of Tourette's Syndrome and (b) published in the English language. Our review found 5 case reports<sup>23-27</sup> and are summarized in Table 1. To date and to the best of our knowledge, this is the first description of the chiropractic care of a patient with Tourette's Syndrome using the Pierce Results System™.

In closing, we wish to caution the reader on the lack of generalizability of the case reported and case reports in general. The lack of a control group, spontaneous remission and the natural history of the disorder, subjective validation, and expectations for clinical resolution on the part of the patient challenge any inferences to the salutary of effects of the care reported. Nonetheless, the purpose of case reports is to describe the clinical encounter and possibly inform higher-level research designs.

### **Conclusion**

This case report builds upon the existing literature to support the possible effectiveness of chiropractic in abating the symptoms associated with Tourette's Syndrome. We encourage further research in this area to examine the clinical details surrounding the chiropractic care of patients with this diagnosis.

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<b>Table 1. Summary of review of the literature on the chiropractic care of patients with Tourette Syndrome</b>		
<b>Reference</b>	<b>Age/Gender</b>	<b>Technique</b>
Trotta <sup>23</sup>	31-yr-old M	Care provided was characterized instrument-assisted adjustments to C1 using the Life Cervical Analysis. Outcome measures utilized self-scoring instruments, a Tourette Syndrome Association (TSA) survey instrument and the Stress Audit Profile (SAP) instrument. The TSA instrument demonstrated relief from symptoms immediately following the adjustments with increasing severity till the next adjustment. The SAP demonstrated stress reduction throughout the patient's care. The patient was cared over 12 visits
Elster <sup>24</sup>	9-yr-old M	The patient suffered from multiple symptom complex, including Tourette's Syndrome. The patient received care consistent with International Upper Cervical Chiropractic Association (IUCCA) through their Applied Upper Cervical Biomechanics (AUCB) program. The patient was adjusted on two occasions and monitored over a period of 6 weeks. Symptoms associated with Tourette Syndrome resolved over this time period.
Stone-McCoy et.al. <sup>25</sup>		The patient received care utilizing the Webster Technique to address pelvic subluxations, Activator and Diversified Technique for spinal subluxations and cranial adjustments over a period of 1 year consisting of 32 patient visits. Improvements in vocal and motor tics were reported.
Ferrucci et al. <sup>26</sup>	45-yr-old M	The patient received care using the CBP Protocol over a period of one year consisting of 108 patient visits. Improvements in the patient's Tourette Syndrome were not well documented.
Martinez et al. <sup>27</sup>	27-yr-old F	Main outcome measures utilized the Yale Global Tic Severity Scale (YGTSS), Yale- Brown Obsessive Compulsive Scale (Y-BCOS), and the Health Status Questionnaire-12 (HSQ-12). The patient received fullspine and extremity "chiropractic manipulative therapy" over a period of 3 months. The main outcome and secondary measures demonstrated Improvement in Tourette Syndrome symptoms.